disease (PD). We evaluated the independent impact of dyskinesia on QoL in patients with PD and evaluated whether commonly used QoL instruments are sensitive enough to measure dyskinesia effects in clinical trials. **METHODS:** We analyzed data from the German PD Competence Network comprising generic (EuroQoL [EQ-5D]) and disease-specific (PD Questionnaire 39 [PDQ-39]) QoL instruments and clinical variables including the Unified Parkinson's Disease Rating Scale (UPDRS). We used 4 dyskinesia-specific UPDRS items (i.e., duration, disability, painfulness of dyskinesias and presence of early-morning dystonia) to predict totals and subscores of EQ-5D and PDQ-39, values of the visual analogue scale (VAS) and EQ-5D derived utilities. We performed ordinal logistic regression to predict EQ-5D subscales and multiple linear regression to predict all remaining QoL outcomes. Potential confounders were specified a priori by an expert panel and final confounders were selected based on statistical criteria (univariate Spearman's rank correlation, multivariate forward selection, $p < 0.05$). **RESULTS:** A total of 68 models were investigated (4 dyskinesia × 17 QoL variables), of which 9 showed a statistically significant association after controlling for confounding. The most relevant confounder was severity of disease. All 4 dyskinesia variables were associated with at least 1 QoL variable. Dyskinesia duration was shown to be the most robust predictor. Subscales of EQ-5D and PDQ-39 addressing pain/(bodily) discomfort were associated with all 4 dyskinesia variables. In addition, EQ-5D index was associated with duration of dyskinesia. **CONCLUSIONS:** Dyskinesia has a significant impact on QoL measured by EQ-5D and PDQ-39 and their subscales, even after controlling for confounding. EQ-5D and PDQ-39 are useful instruments for clinical trials addressing questions on the effect of potential anti-dyskinesia treatments on QoL.

PNL22

EFFECT OF DISEASE-SPECIFIC COMPLICATIONS ON THE PREDICTION OF UTILITIES IN PARKINSON'S DISEASE

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OBJECTIVES: Utility data is often needed in health economic modeling, but not always available in clinical studies in Parkinson's disease (PD). Therefore, we have recently presented a prediction algorithm to estimate utilities from a clinical rating scale. We now report effects of major complications in PD on this prediction algorithm. **METHODS:** Data from an ongoing prospective cost study of the German Competence Network of Parkinson Syndromes was used (n = 115). Our prior utility prediction algorithm was exclusively based on subscales II–IV of the Unified Parkinson's Disease Rating Scale (UPDRS). Now, we applied multivariate regression analysis to investigate the independent effect of sociodemographic factors (age, sex), neuropsychological disturbances (depression, hallucinations, dementia) and motor complications (falls, dyskinesia, fluctuations) on utilities measured by the EuroQoL (EQ-5D). Depression was evaluated by Beck's Depression Inventory (BDI) and dementia by Mini Mental State Examination. **RESULTS:** The study population had a mean age of 67 years and was predominantly male (67%). Mean EQ-5D was 0.74. Among all complications investigated, only depression reached statistical significance ($p = 0.03$). UPDRS variables (subscores from part II, III and IV) remained in the model (see equation): EQ-5D = (103.23 – 1.29*UPDRS II – 0.30*UPDRS III – 1.23*UPDRS IV – 0.55*BDI)/100. After adjusting for UPDRS, depression reduced the utility by 0.55 score units per BDI point. However, the inclusion of BDI only marginally improved the explained variance (adjusted R-square increased from 0.51 to 0.52). **CONCLUSIONS:** Whereas sociodemographic factors, motor complications and neuropsychological disturbances do not exert independent effects on utilities when controlling for UPDRS, depression has an independent effect on EQ-5D. Although depression is not explicitly included in the UPDRS score of parts II–IV, its inclusion did not substantially reduce the unexplained variance. It remains to be investigated which factors further explain the remaining variance.

PNL23

CHRONIC NEUROPATHIC PAIN (NEP) IMPACT ON PATIENT QUALITY OF LIFE AND DISABILITY: RESULTS FROM THE DONEGA STUDY

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OBJECTIVES: The goal of this cross-sectional analysis was to determine pain impact on Quality of Life (QoL) and interference with disability among patients with chronic NeP. **METHODS:** Participants in an observational, prospective and multicentre study in Spain (DONEGA study) with NeP of different etiologies, completed the Short Form-McGill Pain Questionnaire (SF-MPQ), the MOS Short Form-12 (SF-12), and the Sheehan Disability Scale at baseline. **RESULTS:** A total of 1519 patients [mean ± SD; 56.0 ± 13.7 years old (58.8% female)] with NeP were enrolled in the study. Patients had NeP for 1.1 ± 2.8 years, and 83.3% were on any type of analgesic treatment at baseline: oral analgesics (51.2%), topical analgesics (26.9%), NSAID's (11.1%), antiepileptics (7.3%), and psychoanaleptics (3.5%). Average Pain scores were 13.1 ± 8.2 pts., 10.0 ± 5.8 pts., and 3.1 ± 3.3 pts., for total scale (range 0–45), sensory domain (range 0–33), and affective domain (range 0–12), respectively. Present pain intensity was 2.8 ± 1.0 (range 0–5) and mean pain past week on a VAS scale was 71.2 ± 18.9 mm. Pain substantially interfered (≥5 on 0–10 scale) with normal work (6.0 ± 3.1), social life (5.7 ± 3.0), and family life (5.3 ± 3.0), then producing disability; Sheehan total (on 0–30 scale): 17.0 ± 8.4 pts. Country normalized physical (PCS) and mental health (MCS) component summary scores (SF-12) indicated significant impairment in both domains compared to the general Spanish population: PCS; 37.6 ± 6.0 vs. 50.1 ± 9.5, and MCS; 45.9 ± 8.1 vs. 50.0 ± 9.6, respectively. Increasing levels of refractory pain, as assessed by number of medications, corresponded to increasing levels of disability (Sheehan total: 14.2 ± 8.8 to 16.4 ± 8.3, to 18.7 ± 8.1, and to 20.6 ± 7.0, by 0, 1, 2, and 3 medications respectively, $p < 0.01$ for all between group comparisons except 2 vs. 3). **CONCLUSIONS:** NeP decreases patients' physical and mental components of QoL, while increasing level of disability and impaired normal work. The disability increases with level of pain treatment resistance.

PNL31

NEUROPATHIC PAIN (NEP) IMPACT ON PATIENT MENTAL FUNCTIONING, SYMPTOM LEVELS OF ANXIETY AND DEPRESSION, AND SLEEP DISTURBANCE: RESULTS FROM THE DONEGA STUDY

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OBJECTIVES: The goal of this cross-sectional evaluation was to assess pain impact and interference with mental functioning,

symptom levels of anxiety and depression, and sleep impairment among patients with NeP. **METHODS:** Participants in an observational, prospective and multicentre study in Spain (DONEGA study) with NeP of different etiologies, completed the Short Form-McGill Pain Questionnaire (SF-MPQ), the Mini Mental State Examination (MMSE), the COVI Anxiety Scale, the RASKIN Depression Rating Scale, and the MOS Sleep Scale (MOS-S) at baseline. **RESULTS:** A total of 1519 patients above 18 years [mean ± SD; 56.0 ± 13.7 years old (58.8% female)] with NeP were enrolled in the study. Peripheral NeP was presented in >95.0% subjects. Patients had NeP for 1.1 ± 2.8 years, and 83.3% were on any type of analgesic treatment at baseline: oral analgesics (51.2%), topical analgesics (26.9%), NSAID's (11.1%), antiepileptics (7.3%), and psychoanaleptics (3.5%). Average Pain scores were 13.1 ± 8.2 pts, 10.0 ± 5.8 pts, and 3.1 ± 3.3 pts, for total scale (range 0–45), sensory domain (range 0–33), and affective domain (range 0–12), respectively. Present pain intensity was 2.8 ± 1.0 (range 0–5) and mean pain past week on a VAS scale was 71,2 ± 18,9 mm. Pain slightly interfered with patient mental functioning (average MMSE score; 27.2 ± 3.6 pts, 18.0% of patients with MMSE score ≤ 24 pts). Pain interfered with all sleep attributes, obtaining high scoring in composite measures; SLP6; 45.3 ± 21.8, and SLP9; 46.8 ± 21.1. The 24.4% and 15.6% of patients had moderate to severe symptoms levels of anxiety and depression (RASKIN and COVI scores ≥ 9 on 3–15 scale), with an average depression and anxiety scores of 6.3 ± 3.3 pts and 5.4 ± 2.8, respectively. **CONCLUSIONS:** NeP decreases patient mental functioning as assessed by MMSE, while increasing anxiety and depression symptoms and sleep problems. These findings substantially deteriorated with pain severity.

NEUROLOGICAL DISORDERS (Migraine, Alzheimer's, Dementia)

NEUROLOGICAL DISORDERS (Migraine, Alzheimer's, Dementia)—Methods and Concepts

PNL24

COMPARING CLASSIFICATION AND REGRESSION TREE ANALYSIS WITH MULTIPLE REGRESSION FOR TRANSLATING A CLINICAL PARKINSON'S DISEASE SCALE INTO UTILITIES

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OBJECTIVES: Utilities for Parkinson's Disease (PD) are needed for cost-utility analyses of antiparkinsonian treatments but are not always available from PD studies. We compared the performance of classification and regression tree (CART) analysis with multiple regression for mapping the Unified Parkinson's Disease Rating Scale (UPDRS) to utilities. **METHODS:** We used data from an ongoing prospective cost study of the German Competence Network for Parkinson Syndromes. Single UPDRS items were used as predictors for utilities assessed with EuroQoL (EQ-5D). First, we developed a multiple regression model using forward selection based on likelihood ratio testing ($p < 0.05$). Second, we developed a CART model using t-test statistics as selection criteria and adjusting p-values for non-dichotomous variables by the Miller & Siegmund method. The resulting mutual exclusive and exhausting groups were used as predictors in a multiple linear regression model. The performance (goodness-of-fit) of both approaches was compared using explained variance (adjusted R-square statistic). **RESULTS:** The final multiple regression model included a linear combination of three UPDRS subscore variables (i.e., parts II–IV) and yielded an adjusted R-square of 0.55. The final CART model had three levels with four variables partitioning the sample into five subgroups. These variables were level of rigidity (UPDRS item 22), problems arising from a chair (item 27), posture (item 28), and unpredictable fluctuations (item 36). The mean (median) utility in the 5 subgroups was 0.90 (0.89), 0.81 (0.89), 0.68 (0.70), 0.66 (0.70), and 0.32 (0.29). The CART model had adjusted R-square of 0.50. **CONCLUSIONS:** Multiple regression performed slightly better than CART when used to predict utilities based on clinical characteristics of PD patients. Both models were based on feasible and parsimonious prediction rules with only three and four variables, respectively. Whereas multiple regression modeling is the more widely used statistical approach, CART-based prediction models may be easier to interpret for physicians.

PNL25

INTERNAL, EXTERNAL, AND CROSS-MODEL VALIDATION OF A MULTI-OUTCOME DECISION MODEL FOR PARKINSON'S DISEASE

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OBJECTIVES: We have recently reported on a generic, multi-outcome disease model for Parkinson's disease (PD). Now we present first results of internal, external and cross-model validation. **METHODS:** Our lifetime PD Markov model simulates a hypothetical cohort of patients moving through health states reflecting patient characteristics that would be observed in the absence of treatment (Hoehn&Yahr "off" states [HYoff]). We used HYoff I-V and death as Markov states. The model is designed to simultaneously predict multiple outcomes, e.g. time in Hoehn&Yahr "on" states (HYon) observed under treatment, quality-adjusted life expectancy (QALE), or complication rates. As internal validation, we compared time in HYoff stages predicted by our model to results reported in the progression study used to derive our input parameters. As external validation, we compared model results of mean times in HYoff and HYon states with extern literature data not used in our model. Finally, we cross-validated our model comparing QALE under levodopa treatment with QALE of other published models reporting this outcome. **RESULTS:** Internal validation of HYoff input data showed a 97.4–99.9% accuracy. Although external validation of average HYoff progression rates overestimated external population data from Hoehn & Yahr (1967) by 19%, the mean HYon progression rate predicted by our model (0.42 HY stages/y) matched well with estimates reported in the literature (0.40 HY stages/y). After restricting our model to a 5-year time horizon, discounted QALYs exceeded those from 2 other published models by 24% and 35%. This differences were mostly attributable to different Markov state-specific utilities. As other Markov models for drug treatment did not evaluate QALE, we could not cross-validate for this outcome. **CONCLUSIONS:** Our PD model is internal valid and closely reproduces external data for progression under standard treatment. Variability in QALE are due to a combination of different model design, state-specific utilities, and underlying study populations.

PNL26

A NEW SCREENING TOOL FOR MIGRAINE IN THE GENERAL POPULATION: THE MIGRAINE-SCREEN-Q (MS-Q)

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